

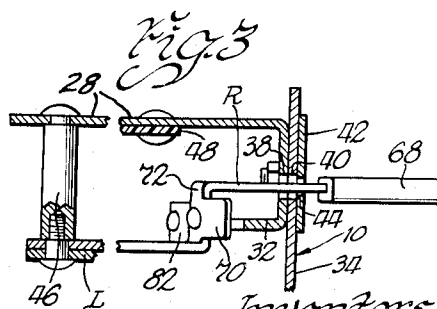
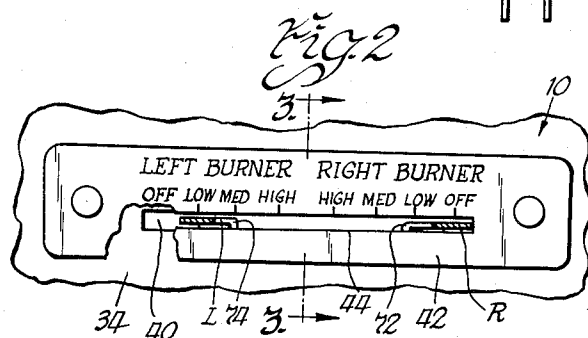
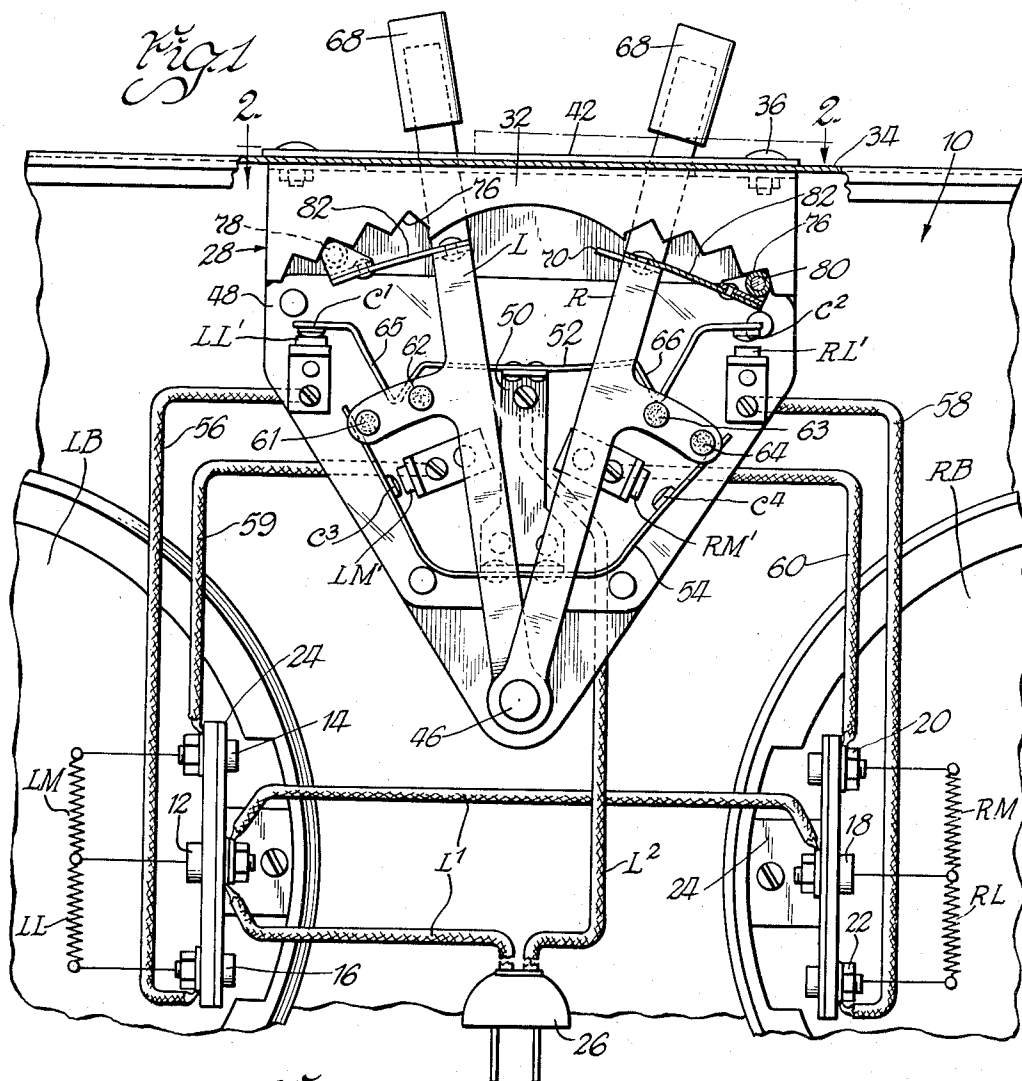
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A. J. HUCK ET AL
INTERLOCK SWITCH

2,725,451

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2 Sheets-Sheet 1



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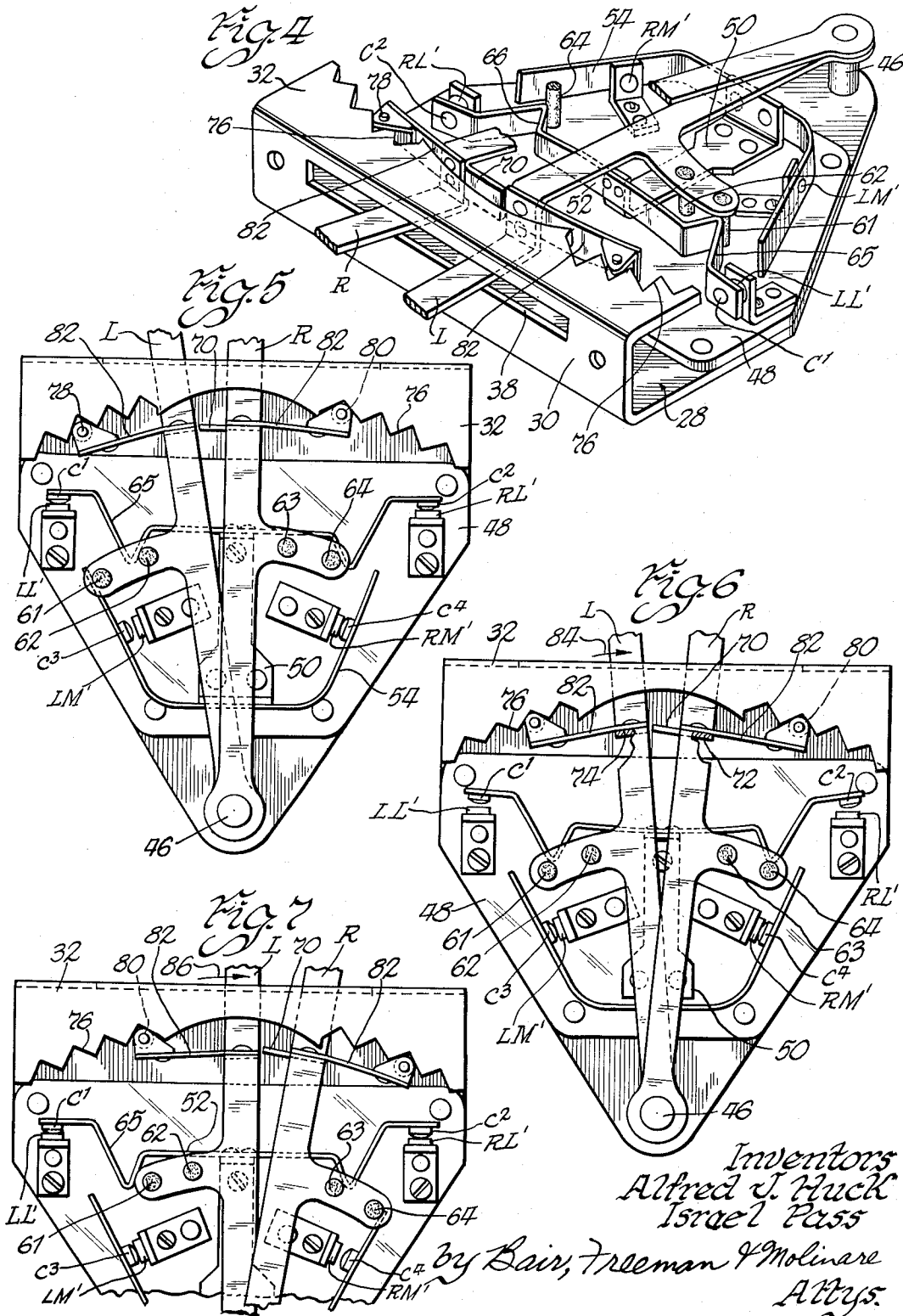
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INTERLOCK SWITCH

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3 Claims. (Cl. 219—20)

This invention relates to a switch for controlling a plurality of electrical appliances such as stove plates or the like wherein parts of two switches are so interlocked mechanically that a maximum wattage is not exceeded in any possible combination of energization for the different stove plates, yet each one under certain conditions can be energized with more than its proportionate share of the total current available.

One object of the invention is to provide a switch of this general character which is simple in construction and can be readily fabricated, the assembled switch being comparatively inexpensive and simple to connect into circuits of the stove plates and the number of terminals and contacts being the least number possible for the stove plates controlled by them, thereby minimizing the number of circuit connections between the switch structure and the heating elements of the stove plates.

Another object is to provide a pair of switches, one for each stove plate, which switches are interlocked mechanically by engagement with each other so that upon adjustment of one switch to a position for maximum current, subsequent adjustment of the other switch beyond its minimum current position will result in retrograde movement of the first switch for an intermediate current value of the first stove plate, and subsequently further adjustment of the second switch to its maximum current position will result in further retrograde movement of the first switch to the minimum current consumption position for its respective stove plate.

A further object is to provide a switch structure specifically designed for two heating units as in an electric hot plate or the like wherein "high," "medium" and "low" heats can be provided for one burner and high, medium and low heats may also be provided for the other burner, the two switches being so interlocked, however, as to permit no more than a medium-medium or high-low combination of the two burners as the maximum available current supply for both burners, and prevent any possibility of either a "medium-high" or "high-high" adjustment.

Still a further object is to provide an interlock switch structure including a minimum of parts and terminals, there being only five terminals on the switch for four heating elements of two stove plates and a line wire, and the absolute minimum possible with respect to sets of contacts (one set for each of the four heating elements), with a single switch arm for each switch capable of manual adjustment and provided with means to coact with the contacts to separate and engage them in a desired sequence.

An additional object is to provide each switch with a detent for which detent notches may be provided in the base member for the switch structure, the parts enumerated being all that are necessary for fully controlling the four heating elements in an interlocking arrangement that permits no more than a "medium-medium" or "low-high" adjustment for the respective burners.

With these and other objects in view, our invention

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consists in the construction, arrangement and combination of the various parts of our interlock switch, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in our claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a bottom plan view of a portion of a two-burner hotplate showing a bottom plan view of my interlock switch construction with certain portions in section to show details and with the heating elements of the burners shown diagrammatically.

Figure 2 is a front elevation of the dial plate for the switch, as taken on the line 2—2 of Figure 1 which cuts through the switch arms, Figure 2 showing them in section.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a perspective view of the switch structure showing it inverted with respect to its position in the stove; and

Figures 5, 6 and 7 are bottom plan views of the switch showing respectively low-high, medium-medium and high-low positions of the switches for the left and right burners respectively.

On the accompanying drawings we have used the reference numeral 10 to indicate the housing of an electric hotplate and LB and RB to indicate the left and right burners thereof. These burners are provided with what are usually termed "low" and "medium" heating elements which we have designated LL for "left-low," LM for "left-medium," RL for "right-low" and RM for "right-medium," the heating elements being shown diagrammatically in Figure 1.

The leads from the heating elements extend to suitable terminals 12, 14, 16, 18, 20 and 22 which are supported on terminal brackets 24 extending downwardly from the burners in the usual manner and suitably insulated therefrom. A line wire L¹ extends from an outlet plug 26 to the terminals 12 and 18.

Our switch structure includes a substantially triangular base 28 formed of sheet metal or the like with a mounting flange 30 along one side and the flange 30 terminates in a detent flange 32. The flange 30 is adapted to be secured to the front wall 34 of the stove housing 10 as by rivets or bolts 36. It has a slot 38 therein through which switch arms L and R extend. The front wall 34 has a slot 40 matching the slot 38 and a dial plate 42 is also secured to the front wall by the bolts 36 and is provided with a similar matching slot 44. This plate as shown in Figure 12 may be provided with suitable indicia to indicate the left and right burners and the positions of the switch arm L and R in relation thereto.

The inner ends of the arms L and R are pivotally mounted on a post 46 extending downwardly from the base plate 28. Since the plate 28 is shown inverted in Figure 4, the post 46 projects upwardly therefrom. Mounted on the base plate 28 and insulated therefrom by a substantially triangular sheet of insulation 48 is a terminal bracket 50 for a second line wire L². Contact springs 52 and 54 are mounted thereon as by means of rivets as illustrated and four contacts C¹, C², C³ and C⁴ are carried thereby for cooperation with four stationary contacts LL', RL', LM' and RM' respectively. The stationary contacts are wired to the heating elements by means of wires, 56, 58, 59 and 60 respectively.

The switch arms L and R are adapted to engage and separate the movable contacts with respect to the stationary contacts and for this purpose are provided with pins 61, 62, 63 and 64 preferably formed of insulating material to avoid short circuits and complications of construction. The pins 61 and 62 are adapted to engage cam nodes 65 and 66 of the contact blade 52 and the pins 63 and 64 are adapted to engage the blades 54 directly as will hereinafter appear in various combina-

tions as the switch arms are moved to different positions. The switch arms are provided with handles 68 outside the dial 42 for convenience in manually moving them to their different possible positions.

The switch arms are adapted for interlocking by reason of engagement with each other and in order to fix the proper position of interlocking engagement one of them is provided with an interlock extension 70. It is shown extending from an elbow 72 of the arm R, this elbow being in circumferential alignment around the axis 46 with a similar elbow 74 of the arm L.

Detent mechanism for holding the switch arms in their different adjusted positions is provided in the form of detent notches 76 formed in the flange 32 as illustrated and detent rollers 78 and 80 for cooperation therewith are carried by leaf springs 82 secured to the elbows 72 and 74.

Practical operation

As shown in Figure 1, the normal position of the right-hand switch lever R at "off" results in the roller 80 engaging in the outermost detent notch 76 at the right-hand end of the flange 32. In this position the pin 64 is holding the contact C⁴ widely spaced from the contact RM' and the pin 63 in engagement with the cam node 66 holds the contact C² spaced from the contact RL'. The left-hand arm L has been moved from the "off" position to the low position so as to permit the contact C³ to assume a position close to yet spaced from the contact LM' while the pin 62 has disengaged the node 65 to permit C¹ to engage LL'. Accordingly, the left-low heating element LL is the only one energized at this time, the circuit being traceable from L¹ to L² as follows: through 12, LL, 16, 56, LL', C', 52 and 50.

Assume now that it is desirable to energize the right burner for high heat (medium heating element RM plus low heating element RL). The right lever R may be moved from the "off" position to the high position as shown in Figure 5. Assuming further that the maximum allowable wattage for the lines L¹ and L² is 1650, the medium heating elements may each have approximately half this wattage, for instance, 824. The low heating elements would then desirably have a rating of about 412 watts so that the low plus high in Figure 5 would be low (412) plus high (824 plus 412) or 1648 watts.

If the left burner is now adjusted from low to medium, the arm L would be moved in the direction of the arrow 84 in Figure 6 and the elbow 74 would engage the interlock extension 70 and move the right switch arm R to its medium position also so that the two mediums (each 824 watts) would result in the maximum of 1648 watts.

Then if the arm L is moved further as indicated by the arrow 86 in Figure 7 to energize the left-hand burner LB for high heat, the right-hand burner will be automatically adjusted back to low heat so as to again get the same maximum wattage of 1648 as in Figure 5 except that the switch positions are reversed. Obviously movement of either R or L toward the other lever will result in the interlocking relation that moves such other lever in a retrograde direction to result in no more than a medium-medium or a high-low combination of energization for the two burners and the desired interlocking of the two switches is secured with a very simple mechanism having but very few parts and those parts being comparatively simple to assemble and electrically connect with the various heating elements.

Some changes may be made in the construction and arrangement of the parts of our interlock switch without departing from the real spirit and purpose of our in-

vention, and it is our intention to cover by our claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

We claim as our invention:

1. In a switch structure for a pair of appliances each having a low and a medium heating element, a pair of switches, one for each heating appliance, each of said switches having first and second contacts adapted to correspond to the low and medium heating elements of the respective appliances, each of said switches being adjustable to three different circuit-energizing positions, said switches in each of said positions of adjustment being operative to close said contacts in different combinations, whereby in one combination of positions of said switches said first contacts are closed by each switch, in another combination the first contacts of the one switch and the second contacts of the other switch respectively are closed, in another combination the second contacts are closed by each switch, and in still another combination both the first and second contacts are closed by the one switch while only the first contacts are closed by the other switch, and a portion of one of said switches engaging a portion of the other to preclude any combination of positions of said switch for closing more than the first contacts by the one switch when both the first and second contacts are closed by the other switch.

2. In a switch structure for a pair of appliances each having a low and a medium heating element, a pair of switches, one for each heating appliance, each of said switches having first and second contacts, said first and second contacts of the one switch being adapted to correspond to the low and medium heating elements respectively of one of the appliances and the first and second contacts of the other switch being adapted to correspond to the low and medium heating elements of the other of the appliances, each of said switches being adjustable to three different circuit-energizing positions to close said contacts in different combinations, a portion of one of said switches engaging a portion of the other to serve as an interlock between said switches, whereby when one of said switches is positioned so as to close both the first and second contacts the other of said switches can be moved only to its position for closing the first contacts.

3. A switching system comprising four contacts for two pairs of circuits, a first switch lever for two of said contacts and a second switch lever for the other two of said contacts, said levers being pivotally mounted and swingable from an initial position of spaced-apart relation to each other to a position closely adjacent each other, interlock means carried by each of said levers and contactingly engaging when said levers are in closely adjacent relation, all of said contacts being open when said levers are in the initial position and successively closing when said levers approach each other for progressively energizing one, the other, and both of the circuits of each pair of circuits, said interlock means when engaged serving to effect retrograde movement of the one switch lever back toward its initial position as the other switch lever is moved toward its position for closing both of said contacts, whereby when the one lever is positioned for closing both the first and second contacts the other lever can be moved only to its position for closing the first contact.

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